

Message Text

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DEPT PASS TO ENVIRONMENT PROTECTION AGENCY; DEPARTMENT OF TRANSPORTATION;
NATIONAL BUREAU OF STANDARDS; NATIONAL OCEANIC AND ATMOSPHERIC
ADMINISTRATION

E.O. 11652: N/A

TAGS: SENV, TGEN, JA

SUBJECT: MIZUSHIMA OIL LEAK REPORT

REF: TOKYO A-5, TOKYO A-59

SUMMARY: ON DEC. 18, 1975 A GOVERNMENT INQUIRY COMMITTEE CAME UP
WITH

FINAL REPORT OF FINDINGS ON MIZUSHIMA OIL SPILL ACCIDENT OF A YEAR
AGO.

RATHER THAN PINPOINTING CAUSES OF OIL TANK LEAK, REPORT CITED OVER A
DOZEN CAUSES OF ACCIDENT AND SUGGESTED A NUMBER OF MEASURES TO BE
TAKEN

TO PREVENT RECURRENCE OF ACCIDENT OF THIS TYPE. THIS MSG BEING SENT
BECAUSE OF SUBSTANTIAL INTEREST EXPRESSED PREVIOUSLY BY USG AGENCIES
IN

INCIDENT. END OF SUMMARY.

1. ALTHOUGH IT IS CALLED "FINAL", REPORT OF GOVERNMENTAL INVESTIGATION
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TION COMMITTEE MADE UP OF 16 EXPERTS IS INCONCLUSIVE IN THAT IT

MERELY LISTED 14 FACTORS WHICH ARE BELIEVED TO HAVE COMBINED TO CAUSE MASSIVE OIL DRAIN AT MITSUBISHI OIL COMPANY'S REFINERY AT MIZUSHIMA.

2. IT IS RECALLED THAT ONE OF TANKS AT REFINERY BURST ON DEC. 18 LAST YEAR AND ABOUT 43,000 KILOLITERS OF OIL FLOWED OUT OF THE 48,000 KILOLITER CAPACITY TANK. IT IS ESTIMATED THAT OF THIS AMOUNT, BETWEEN 7,500 AND 9,000 KILOLITERS OF OIL FOUND ITS WAY INTO MIZUSHIMA BAY AND EVENTUALLY INTO INLAND SEA. OIL SLICKS SPREAD THROUGH WATERS OFF FOUR PREFECTURES, CAUSING EXTENSIVE DAMAGE TO SEAFOOD INDUSTRY. FOR THIS MITSUBISHI HAS HAD TO PAY COMPENSATION OF ABOUT 17 BILLION YEN. THIS PLUS DAMAGES IN TERMS OF COST OF CLEAN-UP, LOSS OF WORK IN MAN-DAYS, AND OTHER ITEMS ADDED UP TO TOTAL OF YEN 50 BILLION.

3. FACT THAT COMMITTEE DID NOT CLARIFY CAUSE OF OIL LEAK WILL AFFECT CIVIL SUITS EXPECTED BETWEEN MITSUBISHI AND THREE FIRMS THAT CONSTRUCTED OIL TANK IN QUESTION--CHIYODA CHEMICAL ENGINEERING & CONSTRUCTION (MAIN CONTRACTOR), ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES (TANK DESIGN AND CONSTRUCTION), AND KUMAGAI GUMI (FOUNDATION CONSTRUCTION).

4. OF THE 14 CAUSES CITED BY COMMITTEE, FOLLOWING LISTED AS MAJOR ONES: (1) FOUNDATION UNDER TANK WEAKENED BECAUSE OF CONSTRUCTION OF VERTICAL STAIRCASE ON SIDE OF TANK: (2) WELDING OF TANK'S SIDE PLATE AND BOTTOM PLATE WAS DEFECTIVE, (3) METAL FATIGUE THROUGH REPEATED FILLING AND EMPTYING OF TANK WITH OIL AT DIFFERENT TEMPERATURES, RESULTING IN EXPANSION AND CONTRACTION OF WELDED AREAS.

5. GIST OF REPORT FOLLOWS. FIRE DEFENSE AGENCY IS FORWARDING COPY OF COMPLETE REPORT (IN JAPANESE) TO SCICOUNS. LIST OF MEMBERS OF INVESTIGATING COMMITTEE ALSO AVAILABLE. IF ANY USG AGENCY INTERESTED, WILL SEND COPY. PLEASE ADVISE.

GIST OF REPORT
OVERALL JUDGEMENT ON CAUSE OF ACCIDENT

1. RUPTURE OF TANK

(1) CRACKS
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THE SURFACE OF THE BOTTOM PLATE OF RUPTURED TANK VARIED IN COLOR FROM GRAYISH-BLUE TO REDDISH-BROWN TO METALLICALLY GLOSSY. AN ANALYSIS OF IRON OXIDES FROM THE GRAYISH BLUE PORTION INDICATES CRACKS HAD DEVELOPED FAIRLY EARLY. CRACKS MAY BE DUE TO FATIGUE FROM LOAD VARIATIONS ATTENDANT TO ADDING AND REMOVING HEAVY OIL (A TOTAL OF 18 TIMES). STRESSES INDUCED BY ADDITION OF THE VERTICAL STAIR-CASE MAY HAVE ACCELERATED RUPTURE OF THE TANK.

(2) FOUNDATION

AFTER THE TANK BEGAN TO BE USED, GROUND SUBSIDENCE CONTINUED DUE TO INCREASED LOAD. LATERAL FLOW IS BELIEVED TO ACCOUNT FOR ABOUT 10 PER CENT OF THE CONSOLIDATION. AN INVESTIGATION OF THE FOUNDATION FOR TANK NO. 271 (THE TANK NEXT TO ONE INVOLVED IN THE ACCIDENT) SHOWED THAT THE GROUND NEAR THE STAIRCASE SUBSIDED MORE THAN UNDER REST OF TANK PARTIALLY. FOUNDATION WORK FOR THE STAIRCASE OF THIS TANK, AS WELL AS THE TANK IN QUESTION, MAY HAVE BEEN DONE WITHOUT CONSIDERATION OF EFFECT ON BOTTOM LOADING. CONSEQUENTLY, THE GAP BETWEEN THE BOTTOM PLATE OF TANK AND THE GROUND IS WIDER THAN WITH OTHER TANKS AND THE BOTTOM PLATE PORTION IN VICINITY OF VERTICAL STAIRCASE HAS BEEN DEFLECTED DOWNWARD.

(3) CONCLUSION

INCIPIENT CRACKS HAD DEVELOPED CONSIDERABLY EARLIER THAN THE TANK RUPTURE. FACTORS RESPONSIBLE FOR THE CRACKS INCLUDE GROUND CHARACTERISTICS

DUE TO THE CONSTRUCTION OF THE VERTICAL STAIRCASE AS WELL AS TO UNDERGROUND WATER AND RAIN WATER RUN OFF. PROBLEMS INVOLVED IN THE RUPTURE OF THE TANK ARE NOT NECESSARILY SIMPLE; A NUMBER OF EFFECTS MAY HAVE ACCUMULATED TO CAUSE THE TANK RUPTURE.

2. DRAIN OF OIL

THE OUTFLOW OF A GREAT AMOUNT OF OIL INTO THE SEA RESULTING IN HEAVY DAMAGE IS ATTRIBUTABLE TO TWO FACTORS: ONE, INSTALLATION OF THE VERTICAL STAIRCASE WEAKENED A PORTION OF THE EMBANKMENT, CAUSING IT TO FAIL AFTER TANK RUPTURE; TWO, AFTER THE ACCIDENT, THE SHUT-OFF VALVES IN PIPING CONNECTED TO THE ADJACENT TANK COULD NOT BE CLOSED, CAUSING THE OIL IN THE ADJACENT TANK TO FLOW OUT THROUGH THE RUPTURED TANK.

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SUGGESTIONS ON SAFETY MEASURES

1. FOUNDATION AND BODY OF TANK

(1) FOUNDATION

BECAUSE THE NATURE OF THE FOUNDATION IMMEDIATELY BELOW THE SIDE PLATE OF TANK CAN PERTURB STRESSES IN THE TANK, IT IS NECESSARY TO RE-EXAMINE THE COMPACTION PROCESS AND TO EXTEND IT BEYOND THE BOTTOM DIMENSIONS OF THE TANK.

(2) BODY OF TANK

SINCE THE JOINT BETWEEN THE SIDE AND BOTTOM PLATES IS CONSTANTLY SUBJECTED TO VARIABLE STRESS, IT SHOULD BE SO SHAPED AS TO AVOID STRESS CONCENTRATION. THE MATERIAL FOR THE SIDE PLATE SHOULD ALSO BE IMPROVED.

2. EMBANKMENT, ETC.

TO PROVIDE AGAINST FIRE AND OIL SPILLAGE, THE EMBANKMENT SHOULD BE SO STRUCTURED AS TO BE ABLE TO ACCOMMODATE A SUFFICIENT AMOUNT OF OIL.

3. PREPARING AND PRESERVING RECORDS

PREPARATION AND PRESERVATION OF RECORDS ON DESIGN AND CONSTRUCTION WORK AS WELL AS OF DOCUMENTS CONCERNING REGULAR TESTS AND REPAIRS SHOULD BE MADE MANDATORY.

4. EXAMINATION AND TESTS

FILLING THE TANK WITH WATER AND CONDUCTING NON-DESTRUCTIVE TESTS SHOULD BE MADE MANDATORY. FOR CARRYING OUT THESE TESTS, A NEUTRAL EXAMINATION AND TEST AGENCY SHOULD BE ESTABLISHED.

5. SAFETY STANDARDS, ETC.

THE FIRE DEFENSE AGENCY STANDARDS, WITH EMPHASIS ON FIRE PREVENTION AND CONTROL, SHOULD BE RE-EXAMINED IN THE LIGHT OF THE OIL SPILL ACCIDENT. ALSO, ORGANIZATION AND FUNCTIONS OF THE FIRE DEFENSE AGENCY SHOULD BE STRENGTHENED.
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